# A Review of FAA Overflight Fees

**Capital Economics**

**1299 Pennsylvania Avenue**

**Washington, DC 20004**

## QUALIFICATIONS

Capital Economics is an economic consulting firm located in Washington, DC, specializing in economic, statistical, and financial analysis applied to complex litigation and regulatory settings. Capital Economics professionals are highly-trained economists, financial analysts, and computer specialists. Several staff members have high-level government experience, and many have served as expert witnesses. The firm is skilled in quantitative analysis, particularly in the application of state-of-the-art economic and statistical methods to litigation and regulatory matters.

**PRINCIPAL AUTHORS**

**Richard S. Higgins**
*Ph.D in Economics, University of Virginia*
*President*

Dr. Higgins oversees all of the consulting work carried out by Capital Economics. His specialization is the application of economic analysis to both merger and non-merger antitrust investigations. These investigations have involved economic analyses of all stages of industry, including manufacturing, distribution, marketing and retailing. Dr. Higgins has industry expertise in numerous areas, including: food and beverages; petroleum and natural gas, including pipeline transportation; heavy machinery; automobile and truck tires; pulp and paper; defense electronics; telecommunications; laser and infra-red devices; and human vaccines. Dr. Higgins has published a number of articles and books on matters relating to regulation. He was previously Deputy Director for Consumer Protection and Regulatory Analysis at the Federal Trade Commission.

**John T. Sullivan**
*Ph.D in Economics, George Mason University*
*Senior Economist*

Dr. Sullivan specializes in economic analysis and litigation support to expert witnesses, law firms and corporate counsel. He has considerable experience in analyzing market definition, entry conditions, industry and firm cost structures, competitor conduct and market performance for clients involved in a variety of litigation matters and industries. Dr. Sullivan's academic specialization is in Industrial Organization and Public Choice and his doctoral dissertation concerned theories of economic regulation and deregulation. He has published in the Journal of Public Choice.

**Jonathan S. Bowater**
*M.Sc. in Economics, University of Bristol*
*Economist*

Mr. Bowater specializes in applying statistical and econometric analyses to economic issues arising in litigation settings. He has particular experience applying detailed quantitative techniques in horizontal merger investigations. His work has covered a broad range of industries, including steel, diesel engines, construction and agricultural equipment, international spirits, beer, electrical consumer goods, broadcasting and telecommunications. Having previously worked in London, he has experience in a wide range of proceedings and litigation matters under the jurisdiction of the European Commission and a number of European national competition authorities.

## I. INTRODUCTION

Capital Economics has been asked by the Federal Aviation Administration (FAA) to review the fee schedule developed by the FAA to recover the cost of providing air traffic control (ATC) services to "Overflights" using U.S.-controlled airspace. The current fee schedule was developed under an Act of Congress (49 U.S.C. 45301) and is implemented by means of an Interim Final Rule (IFR) as required by that Act. The FAA requested this review in response to the comments received on its Interim Final Rule.

Overflights, as defined by the Act, are aircraft transiting U.S.-controlled airspace that "neither take off from, nor land in, the United States." Military and civilian aircraft of the U.S. government or of a foreign government are exempt from the definition. Although not defined by the Act, the counterpart to an Overflight is a non-Overflight, which is an aircraft transiting U.S.-controlled airspace that takes off from and/or lands in the United States. Considering these two types of flights, it is important to note that many non-Overflights, for much of their journey, have the same characteristics as Overflights as they fly over servicing Air Route Traffic Control Centers (ARTCCs or Centers) or sectors within those Centers.

### *Summary of Findings*

Our review concludes that the FAA's fee structure is within the guidelines of commonly accepted economic principles as applied in practical, real-world settings. We find that the FAA's reliance on a mileage-based fee structure is within the statutory requirements of being cost-based and not value-based. We find that due to the high metering costs of other alternative methods, the mileage-based metric is likely to be the cheapest metric to employ to assign costs on an individual flight basis. In addition, ignoring the metering costs of the various alternatives, we find that there is no "better" alternative allocation mechanism than the mileage-based method used by the FAA. We also find that the fee structure is *subsidy-free,* as defined herein, which many economists consider to be a desirable property.

The basis for these conclusions is captured in this paper. The remainder of this paper is organized as follows: Section II presents the cost and fee setting principles that are to be applied in the case of Overflights; Section III actually applies the principles of Section II to the case of Overflights, with subsections dealing specifically with the Enroute and Oceanic environments; Section III also includes a discussion of the conservatism of the FAA's methodology in setting Overflight fees and a discussion of Center-based fees; Section IV states our conclusions.

## II. COST AND FEE-SETTING PRINCIPLES

This section of the paper presents an overview of the costing and fee-setting principles that frame the ensuing analysis. This includes a discussion of various cost concepts, Ramsey pricing and subsidy-free fees.

The statute at issue requires that fees be "directly related" to costs. In other venues, a requirement of this nature is stated differently but is no less binding: fees should be "causally connected" to costs, "attributable" to output, "fair, reasonable and nondiscriminatory," and so on. There is no standard, or agreed upon, definition of "directly related" in the accounting or economic fields. A precise definition of "directly related" is therefore elusive, but at a minimum it embodies the notion that fees include those costs that are traceable to the production of the service for which the fee is being set. Clearly this encompasses the economic concept of marginal cost.

Marginal cost is the change in total cost caused by a small change in output. Setting fees equal to marginal cost is a non-controversial approach to fee-setting when the process of producing the goods or services to be priced does not involve economies of scale or economies of scope and when the cost of metering is trivial.[1] In such an instance, fees are obviously directly related to cost, and the sum of all fees collected equals the total cost of producing the service.

---

[1] "Economies of scale" refers to a production process in which the average cost of providing a single activity (either alone or in conjunction with others) declines with the chosen scale of the activity. "Economies of scope" refers to a production process where it is cheaper to produce two products together rather than producing them separately. Cost of metering refers to the monitoring and calculation costs that would be required to quantify precisely the marginal costs for each category of service.

One of the most important causes of economies of scale is the existence of fixed costs that do not vary with the level of output. One of the most important causes of economies of scope is the use of common inputs in the process of producing multiple services. In the presence of either or both of these factors, prices set equal to marginal cost will no longer cover the costs of the activity for which a fee is to be established. Faced with this situation, economists typically call for a fee system involving a marginal or incremental component plus a markup to cover fixed and common costs.

Even in the case of no economies of scale or scope, marginal cost pricing is an ideal that may be inefficient to effect when metering is costly. If it is costly to meter the differences between different user groups, it may be more efficient to use a fee system based on average costs or some other metric.

In the previous litigation on FAA's Overflight Fees, the United States Court of Appeals for the District of Columbia Circuit clearly recognized that the supply of ATC services to Overflights entails fixed and common costs that must be allocated:

> "The difficulty with determining the portion of fixed and common costs attributable to overflights is that by definition these costs are shared among a great number of users besides overflights and so, in a sense, do not directly relate to the quantity of services consumed. Thus, a method must be devised to apportion these costs among all the users who benefit from them, without violating the strictures of the statute."[2]

Many, if not most, economists prefer the method of Ramsey Pricing for allocating these costs. In the 1995 Cost Allocation Study, which was the basis for the 1997 fees, Ramsey pricing was used to allocate fixed and common costs to Overflight users of air traffic control services. Ramsey pricing is a method in which the fixed and common costs incurred in supplying a service are allocated to users of the service based on each user's valuation of the service. More precisely, Ramsey prices are based on demand elasticities. Those users whose demand is less sensitive to price (i.e. inelastic) are allocated a higher portion of fixed and common costs than

---

[2] Asiana Airlines et. al. v. the FAA, 328 U.S. App. D.C. 237, 134F. 3d 393, 1998 U.S. App. LEXIS 1286 (1998).

those users whose demand is more sensitive to price (i.e. elastic). The allocation of fixed and common costs is reflected in the mark-up over marginal cost that each user pays. From an economic efficiency standpoint, this is the least distorting method by which to allocate fixed and common costs to users of a service.

The application of Ramsey pricing to the allocation of fixed and common costs was found by the Court to violate the statute establishing Overflight fees. The Court ruled that:

> "[The FAA] may not set fees on a basis other than cost. In this case it attempted to do so when it apportioned its costs among user groups based on each group's relative sensitivity to the amount charged."[3]

However, the Court did opine that:

> "There may be methods to reasonably determine an appropriate fraction of the FAA's fixed costs to assign to each overflight, and if the FAA does not have enough information to precisely determine the burdens imposed by individual flights, it may proceed based on the best data available."[4]

The Court's ruling makes clear the task confronting the FAA. The provision of air traffic control services entails common and fixed costs that must be allocated among all users who benefit from them. Such allocations cannot be based on value. The FAA is to proceed using the best available data.

Beyond Ramsey pricing, no single method for allocating fixed and common costs has a similar broad endorsement of economists. The need for cost allocation is clearly recognized, but there are many appropriate methodologies. This problem arises in practice in countless settings: virtually every business firm or government organization provides not just one service but several, and these services are often the joint product of the entity's operations. It may be possible to isolate the marginal or incremental costs of servicing a particular subgroup of

---

[3] Ibid.

[4] Ibid.

customers, and this may be possible for each and every conceivable subset of customers. However, in the presence of fixed and common costs the sum of these marginal costs will fall below the total costs of serving all customers. In the extreme, but not uncommon, case of very large fixed and common costs, it is quite possible that the separate marginal or incremental costs of servicing any and all subgroups is virtually zero for each group. It is customary in these instances to allocate costs based on sales revenues, level of customer activity, level of production, or some other similar, conventional method. Examples of such allocation methods are ubiquitous. Both public and private entities often allocate the costs of their Human Resources department across the operating divisions of the entity based on each division's percentage share of total headcount.[5] Lang notes that sawmills allocate the joint costs of producing various grades of lumber based on each grade's share of total board-feet milled.[6] Mitchell & Vogelsang (1991) develop formulas for instituting fees using revenue shares, cost shares and output shares as allocation mechanisms.[7] In the present case the FAA is constrained by statute not to use any method that would allocate these costs based on value, and this limits the list of available methods. As discussed momentarily, Faulhaber's (1975) concept of *subsidy-free* pricing can be used to further narrow the list of allocation mechanisms to those that result in fees that prevent one service from subsidizing or being subsidized by the other services offered.[8]

We close this section with a discussion of *subsidy-free* pricing, but it is useful to summarize our overall findings presently. The FAA's current Fee Determination for Overflights satisfies the statute's criterion that the fee not be based on user value but, rather, on costs. The basis of the current fee is the FAA's calculation of the total costs of supplying air traffic control

---

[5] Kahn, Alfred, *The Economics of Regulation, Principles and Institutions*, Cambridge, MA: MIT Press, 1993, Volume I.

[6] Lang, Theo, ed., *The Cost Accountants' Handbook*, New York: Ronald, 1947, page 526.

[7] Mitchell, Bridger M. and Vogelsang, Ingo, *Telecommunications Pricing Theory and Practice,* Cambridge University Press: Cambridge, 1991, Pp. 118 - 139.

[8] Faulhaber, Gerald R. Cross-subsidization: Pricing in Public Enterprises. *American Economic Review*, 65:966-77.

services in Enroute and Oceanic airspace using its cost accounting system.[9] Because of the presence of fixed and shared costs, each Overflight has to be allocated a portion of the total cost incurred in supplying Enroute and Oceanic services in connection to the recovery of costs. The basis for determining the size of the allocation and thus the fee in the current determination is the great circle distance of the particular flight (flight miles). Flight miles are calculated as the minimum distance that a particular flight may have traveled in Enroute or Oceanic airspace based on the point that the particular flight entered and exited the airspace. We find that this is a cost effective allocation mechanism for generating fees that are particularized to individual flights. We further find that this method avoids basing fees on value and generates a fee structure that is *subsidy-free,* as defined below.

*Benefits of Subsidy-Free Pricing*

Fees that are *subsidy-free* are widely regarded by economists to be preferable to those that are not.[10] This is because *subsidy-free* fees prevent one service from subsidizing or from being subsidized by the other services offered. Thus, by further subjecting the FAA fee structure to the requirement that it be *subsidy-free* we ensure that there are no cross-subsidies between Overflights and non-Overflights.

*Subsidy-free* fees are defined as those that pass two tests: (1) fee revenues from a service do not exceed the Stand Alone Costs (SAC) of that service; and (2) fee revenues for a service are never below the incremental cost of that service, measured as the total cost savings of not producing the service.

---

[9] Enroute and Oceanic air traffic control services constitute distinct FAA services over which it is possible to measure costs accurately. FAA, assisted by Arthur Andersen, has developed a system which captures the total cost of providing air traffic control services in each airspace based on the cost of the inputs needed to supply the services in each airspace. Overflights utilize one or both of the Enroute and Oceanic services.

[10] Note that subsidy-free pricing refers to prices that do not receive a cross-subsidy from the prices received on the other products or services of a multi-product firm or production process. That is, subsidy-free pricing is not concerned with whether the product is being subsidized by some external source, such as a general taxpayer subsidy.

SAC refer to the cost of providing the services at issue in isolation. In the present case we ask the hypothetical question: If the FAA were only required to provide Enroute and Oceanic air traffic control service to Overflights and if the FAA were permitted to design an optimally efficient system to do so, what would the costs be?

Incremental cost, or more specifically long run incremental cost (LRIC), is the total cost saved when a service or group of services is discontinued, while maintaining the other services at expected levels.[11] LRIC is based on the total volume of the particular service or group of services normally used. But, as the second of the subsidy-free tests indicates, this amount is only the minimum fee that should be charged. When the services at issue are defined narrowly, as in the present case, it is likely that joint and common costs will arise which will require an additional component to the fees to cover these costs. When the common costs are very large relative to the LRIC, the resulting fee will be essentially driven by the allocation scheme employed to cover common costs. However, as the first of the subsidy-free tests indicates, the total fee should not result in receipts that exceed the cost of providing the particular group of services at expected levels while not providing any of the other services that may normally be provided along with them. That is, the SAC of providing the individual service by itself serves as an upper bound on the magnitude of the fee.

---

[11] Economists typically advocate using "total service long run incremental costs" (TSLRINC) plus a markup to cover joint and common costs if required. The "incremental" in TSLRINC refers to the difference in overall cost with and without the activity category in question; "long run" means that costs of the activity reflect the most efficient method of production. This entails allowing for optimal scale and scope of complementary activities with and without the activities in question. For example, the total combined costs of providing more than one activity is often less than the sum of the costs of providing the same levels of several activities separately. Finally, the "total service" in TSLRINC refers to the attempt to define the bundle of goods and services to be priced in a broad enough way so as to minimize the allocation issues that arise from joint and common costs. The broader the service groupings for which incremental cost is assessed, the less likely that there are joint or shared costs above TSLRINC. Unfortunately in the present circumstance we do not have the luxury of determining the service level that must be priced. We are constrained to evaluating Overflights. When the services at issue are defined narrowly as in the present case we are left with attempting to quantify the long run incremental cost (LRIC) of an individual service, which is likely to give rise to significant joint and common costs.

## III. FEE SETTING: THE CASE OF OVERFLIGHTS

The FAA's production process for delivering Overflight services in the Enroute and Oceanic environments is characterized by massive economies of scale and scope. The economies of scale derive from a multitude of sources, particularly infrastructure indivisibilities. Significant fixed assets such as radar systems, navigation and voice communication systems, computer support systems, control Center facilities and so on, are employed in the production of Enroute and Oceanic Overflight and non-Overflight services. The economies of scope derive from the fact that virtually every input involved in the production of Overflight services is also used in the production of non-Overflight services in these environments. All of the fixed assets noted above are used jointly to produce Overflight and non-Overflight services. In addition, virtually all of the traditionally variable inputs used to produce Overflight services, such as labor, are used jointly to produce non-Overflight services as well.

### *A. Enroute*

The marginal cost of servicing any particular flight in the Enroute environment is very small. This is due to several factors. The Enroute airspace environment is not capacity constrained. System constraints do exist, but they are in other environments, such as Terminal Radar Approach Control Facility (TRACON) and Terminal Operations.[12] In addition, for safety purposes, the air traffic control system has significant built-in redundancy, with multiple overlapping components. Also, in providing air traffic control services, the FAA incurs costs by making services available (e.g., radio navigation aids and broadcast weather services) regardless of whether any particular flight uses the services. These services are always available in full supply to any and all users that need to use them. Once an aircraft enters U.S.-controlled airspace, the U.S. ATC system is immediately engaged, and the entire ATC infrastructure and full scope of services are available, regardless of the type of flight, user or aircraft. The

---

12 Note: Terminal and TRACON costs, as well as Flight Service Station costs, are not included in the cost recovery base that Overflight fees recoup. In Attachment 2 to this report FAA provides further clarification of the service definitions used in the Cost Accounting System.

requirements of providing full and constant availability of services to all users are designed into the system and result in real costs incurred in the provision of air traffic control services.

These factors ensure that no additional physical assets would be required to service an additional flight. In addition, the level of service utilization does not directly impact on those costs that in many other contexts are considered variable, such as labor costs. Consider the following:

(1) An air traffic controller is paid the same amount regardless of whether he or she has to monitor a particular aircraft across his or her screen or communicate directly with that aircraft. Similarly, a controller is paid the same regardless of whether he or she has to communicate with an aircraft once or a dozen times. A controller is also paid the same regardless of whether he or she works during hours when the airspace is quiet or hours when the airspace is busy.

(2) Controllers have to be trained to provide all Enroute air traffic control services and meet all air traffic situations regardless of whether or not they encounter all air traffic situations. The cost of training does not vary depending on how much service is delivered.

(3) Enroute radar and navigation equipment have to be operational at all times regardless of how many flights are in the airspace. It is not possible to shut off one or more radar or navigational aids at any point in the day in order to reduce the overall cost of the radar system.

(4) Telecommunications capability and capacity have to be available at all times during the day regardless of whether any, or how many, transmissions are made. Telecommunication services are procured on a fixed lease basis, similar to renting a pipeline, whereby costs do not increase with small additions to traffic.

Thus, in addition to the fact that the entire ATC system is built to provide a level of service to all users, regardless of whether they actually utilize all the services, the lumpy (fixed over substantial output ranges) nature of input costs traditionally considered to be variable, such as labor or communications, means that the additional cost of servicing an additional flight is very small.

This is not to say that there are no differences in the marginal costs of servicing one type of Enroute flight versus another. It is to say however that both costs are very small and are swamped by the allocation of fixed and common costs that must be made in order to cover the costs of ATC services.[13]

This is an absolutely crucial point that seems lost on commenters, who complain that activity-based costing or some other close examination of the production process would allow a more direct and complete relationship between costs and outputs to be established. In other words, they hold that while the costs may be difficult to trace back to individual outputs, it is in fact possible to do so and a careful study of the activities involved will shed light on how costs should be assigned. This reveals a misunderstanding of common and joint costs, which are the primary feature of air traffic control costs in providing services to Overflights.

Consider an example of an input that is common to the production of two outputs, such as the fence that a farmer installs to contain his cows and sheep. The installation cost of the fence is clearly common to both the production of cows and of sheep. Commenters would suggest that studying the production process under activity based costing principles would allow for the cost of the fence to be attributed precisely between the cows and sheep. But in reality they can not be so assigned regardless of how closely they are studied. They are shared costs.

Even inputs that are traditionally considered variable, such as labor, can be largely or completely common. Consider the case where all the wear and tear on the farmer's fence is due to aging. The farmer's time spent on fence mending is a cost that is common to both the

---

[13] In addition, as noted previously, metering the differences in marginal costs may be very costly.

production of cows and sheep, and no amount of scrutiny or activity based costing techniques will allow them to be assigned to one output versus the other. The farmer's fence-mending efforts are a common input into the production of both cows and sheep. In a similar vein, it is not at all clear that controller time used in providing ATC services to flights is separable or assignable to individual flights. The suggestion that monitoring contacts made with aircraft will allow one to do this ignores the fact that, in providing ATC services, a controller is by definition simultaneously monitoring and providing safe passage for all flights within his or her airspace, Overflights and non-Overflights included.

If we expand the analysis to consider the incremental cost of adding the entire block of Overflights as a group while holding all other services at their normal levels we must conclude that the change in total costs is still very small. That is, if we start with a system that handles only non-Overflights and then add all Overflight traffic to that system, the change in total costs would be negligible. But this is also true of any similarly-sized subgroup of flights. Whether this subset be defined as "Overflights" or "all flights that are en route to South Dakota," the change in total costs from serving these subsets (holding all other services at their regular levels) is negligible. This is true of any system characterized by very large shared input costs. Moreover, to trace costs to specific services also has its costs. In such circumstances, a composite of services is usually priced as a group.

Thus, commenters' complaint that the current fee determination fails to account for such factors as the number of communication contacts made to a specific flight is misguided on several fronts. If the complaint is that measuring communication contacts made would allow for a more precise identification of marginal costs, we note that controller time appears largely (and perhaps completely) common to the servicing of Overflights and Non-Overflights. We also note that, even if separate marginal costs can be identified and even if the marginal cost of servicing Non-Overflights is higher than that of Overflights, the absolute difference between the two is small compared to the large fixed and common costs that must be allocated. If, on the other hand, the complaint is that allocating common and fixed costs based on communication contacts would constitute a "better" allocation mechanism than one based on miles, we note that the FAA

has informed us that it would be very difficult and expensive to implement a fee system based on metering the communication contacts made for each flight. Even ignoring metering costs, using communication contacts to allocate costs is no more suitable a method than using miles flown. Finally, we note that using flight-miles as a basis for setting fees in aviation matters is an internationally accepted and widely used practice.[14]

### ***B. Oceanic***

The same considerations discussed above in relation to the marginal cost of servicing any particular flight in the Enroute environment also apply to the Oceanic environment. The marginal cost of servicing any Overflight or non-Overflight in the Oceanic environment is very small. In fact, there may be no difference in the marginal costs between the two types of flight as the same types of procedural controls are generally used for non-Overflights as for Overflights. The services they receive are very similar, if not identical, while in the Oceanic environment. But, more importantly, any marginal cost differences that do exist are swamped by the large fixed and common costs that must be allocated.

### ***C. Tests for Subsidy-Free Fees***

Fees that are *subsidy-free* are widely regarded by economists to be preferable to those that are not. This is because *subsidy-free* fees prevent one service from subsidizing or from being subsidized by the other services offered.

*Subsidy-free* fees are defined as those that pass two tests: (1) fee revenues from a service do not exceed the Stand Alone Costs (SAC) of that service; and (2) fee revenues for a service are never below the incremental cost of that service, measured as the total cost savings of not producing the service.

---

[14] See: Manual of Airport and Air Navigation Facility Tariffs, International Civil Aviation Organization, Doc 7100, 1999. Also see, IATA Airport and Enroute Aviation Charges Manual.

An FAA analysis of Enroute Overflights, attached to this report as Attachment 1, has determined that the stand alone cost of servicing these flights is at least $181M.[15] The cost of servicing these Enroute Overflights (which underlies the current fee structure) is estimated to be approximately $30M, which is well below the upper bound, the SAC of serving these flights Thus, the current fee structure quite easily passes the first of the subsidy-free tests outlined earlier: revenues for the service do not exceed the SAC of the service. In addition, as commenters have argued, the incremental cost of servicing Overflights is extremely low and perhaps nearly zero. Thus, the estimated $30M cost that serves as the basis for Enroute Overflight fees under the current fee structure easily passes the second test for subsidy-free pricing: the costs recovered by the fees are never lower than incremental costs.

An FAA analysis of Oceanic Overflights, included in Attachment 1, has determined that the stand alone cost of these flights is at least $28M. As a result, the current fee structure easily passes the first of the subsidy-free tests outlined earlier. That is, the current fee structure is based on an estimate of approximately $19M to service these flights, which is well below the SAC of serving these flights. In addition, as commenters have argued, the incremental cost of servicing Overflights is very low. Thus, the estimated $19M in costs which underlies the current fee structure easily passes the second test for subsidy-free pricing: the costs recovered by the fees are never lower than incremental costs.

### ***D. FAA's Conservative Approach***

In the current fee determination, the FAA adopted a conservative approach in its treatment of overhead costs. Specifically, in measuring the total cost of supplying air traffic services in the Enroute and Oceanic environments, which is the basis for determining Overflight fees, the FAA removed overhead costs. The majority of these overhead costs is comprised of the share of the FAA's Headquarters and Regional Office costs that are allocated to the cost of

---

[15] The stand alone cost estimates for the Oceanic and Enroute environments are extremely conservative. For example, they exclude all controller costs, even though some unspecified number of controllers would be needed to provide the service.

supplying Enroute and Oceanic air traffic control. Overheads are a necessary cost that the FAA has to face which in part arise because of the provision of Enroute and Oceanic air traffic services. It is not unreasonable, therefore, for flights in the Enroute and Oceanic environment, and consequently Overflights to bear their share of these costs. However, through an abundance of caution, the FAA has excluded these costs from the fee determination. In total, the FAA removed 12% of the total cost of supplying Enroute air traffic services and 7% of the total cost of supplying Oceanic air traffic services. The recovery of overhead costs in user fees and charges is a widely used and accepted practice, both in the U.S. and internationally. OMB Circular No. A-25, which provides government-wide policy with respect to User Charges, indicates that overhead costs are appropriate for inclusion in the cost recovery base for user charges. Similarly, ICAO guidance and recommended principles also allow recovery of overhead costs. We find that strict adherence to fee-setting principles would dictate the recovery of these overheads and that the FAA's treatment of them is very conservative.

***E. Differences Across Centers***

Commenters complain that the FAA has acknowledged that its cost accounting system allows it to measure costs by Center. They argue that, therefore, Overflights should be charged based on the actual Centers crossed since costs may vary by Center.

In the current fee determination, the FAA has opted for a simplified fee structure to minimize Overflight administration costs, particularly for the introduction of the fees. The present fee determination aggregates costs across Centers and charges a per-mile fee based on the total cost of all Centers. In effect, the fee is based on an average Center cost. We understand that the FAA has received some comments on this issue, and we submit that it may be an area of potential future modification of the fee structure.

The administrative burden of proving flight tracking, billing and collections, and customer service related to Center-based fees would be significant. Establishing fees by Center would mean additional workload that would include: setting up, maintaining, and monitoring an automated system to provide the necessary data; conducting quality control for billing and

collections to ensure that each flight has been assigned the appropriate rate for each Center; and providing customer support for such detailed inquiries. All these costs would add to the overall cost of supplying ATC services to Overflights, which all Overflights would have to bear through higher fees. These administration costs could result in higher overall fees for all. In addition, there are some specific service costs that have been identified in total for all Centers, but a determination has not yet been made as to how best to attribute them to specific Centers. Thus, achieving Center-based pricing would require additional accounting work.

## IV. CONCLUSION

The FAA's production process for delivering Overflight services in the Enroute and Oceanic environments is characterized by significant economies of scale, economies of scope, and metering costs. These circumstances require the FAA to allocate costs in setting a fee structure in order to recover the costs related to Overflights. We find that the FAA's reliance on a mileage-based allocation method provides a fee structure that is within the statutory requirements of being cost-based and not value-based. We find that due to the high metering costs of other alternative methods, the mileage-based metric is likely to be the cheapest metric to employ to assign costs on an individual flight basis. In addition, ignoring the metering costs of the various alternatives, we find that there is no "better" alternative allocation mechanism than the mileage-based method used by the FAA. We also find that the fee structure is *subsidy-free,* as defined herein, which many economists consider to be a desirable property.

# Attachment 1

# FAA Estimate of Stand Alone Costs For Overflights

## Methodology

In order to support an economic analysis of the cost to service Overflights, based on a hypothetical scenario where FAA *only* provides air traffic control services to Overflights, cost data was obtained from the FAA's cost accounting system.

This hypothetical scenario was based on the following assumptions:

- FAA would only require three Air Route Traffic Control Centers (ARTCCs) to provide service. We selected New York, Kansas City, and Oakland in order to achieve geographic coverage as well as encompass Oceanic capabilities.
- For the purposes of this analysis, we only identified the cost to maintain the physical infrastructure (e.g., buildings, surveillance equipment, navigation equipment, communications equipment, and various support equipment) associated with each of the three ARTCCs. No controller or controller-related costs were included. Specifically, the following cost elements are not included in this estimate but *are* required to service overflights: Air Traffic Operations field labor and non-labor, ATC System Command Center, contract weather, contract training, Academy training, aviation medical, aviation security, and workers compensation. For a complete description of each cost element see the Costing Methodology Report.
- FY1999 cost data was used in order to be consistent with the cost data used to develop Overflight fees.

This stand alone estimate was derived from three queries against the FAA's cost accounting system. These queries were based on existing query designs/templates developed by the Air Traffic Services organization. A description of each query follows:

**Query 1** – *Local Enroute Costs*– This query retrieved the Enroute-related cost to maintain all equipment assigned to the New York, Kansas City, and Oakland Enroute Centers. The cost data is organized by capability (i.e., automation, surveillance, communications, etc.) and cost element (i.e., labor, non-labor, overhead, etc.).

**Query 2** – *Addt'l Enroute Costs* – This query retrieved the cost to maintain the nation-wide network of long range radars and enroute navigation equipment. This report excludes all radars and navigation equipment already assigned to New York, Kansas City, and Oakland.

**Enroute Total** – This column sums the result of query 1 and query 2 to provide the total Enroute maintenance cost to service overflights based on our hypothetical case.

**Query 3** – *Oceanic Costs* – This query retrieved the Oceanic-related cost to maintain all equipment assigned to the New York and Oakland Oceanic Centers. The cost data is also organized by capability and cost element.

**Total** – This column sums the result of query 3 and the Enroute Total to provide the total maintenance cost to service overflights based on our hypothetical case.

**Estimated Partial Stand Alone Cost to Service Overflights**

| | Local Enroute Costs (for ZNY, ZKC, ZOA) | Additional Costs (for LRR and VOR network) | Enroute Total | Total Oceanic Costs (for ZNY, ZOA) | Total |
|---|---|---|---|---|---|
| IN WHOLE DOLLARS | | | | | |
| **Cost Element** [1] | | | | | |
| **Airway Facilities Operations Labor** | | | | | |
| SSC Field Labor | $ 23,596,288 | $ 29,443,027 | $ 53,039,315 | $ 1,685,608 | $ 54,724,923 |
| SMO Field Labor | 107 | 68,204 | 68,311 | - | 68,311 |
| Accruals & Adj Labor | 203,835 | 227,441 | 431,275 | (405) | 430,870 |
| National Maintenance Command Center | - | - | - | - | - |
| Field Non-Labor | 2,471,445 | 3,861,346 | 6,332,791 | 190,357 | 6,523,149 |
| Telecommunications | 13,805,055 | 4,824,871 | 18,629,926 | 22,782,038 | 41,411,964 |
| Flight Inspection | 1,922,477 | 13,026,377 | 14,948,854 | - | 14,948,854 |
| Energy | 4,467,595 | 7,050,271 | 11,517,866 | 502,010 | 12,019,876 |
| Maintenance Contracts | 2,510,405 | 466,067 | 2,976,471 | 1,570,924 | 4,547,396 |
| Logistics | 5,487,063 | 18,304,407 | 23,791,470 | 98,727 | 23,890,198 |
| Academy Training | - | - | - | - | - |
| Workers Compensation | 442,867 | 551,420 | 994,287 | 31,345 | 1,025,632 |
| SMP/Compliance | 143,714 | 108,464 | 252,178 | 2,741 | 254,919 |
| Subtotal | 55,050,850 | 77,931,895 | 132,982,745 | 26,863,345 | 159,846,091 |
| **Other LOB Direct** | | | | | |
| **Overhead Allocations** | | | | | |
| ATS Regional Overhead | 5,978,302 | 7,252,511 | 13,230,813 | 352,418 | 13,583,231 |
| ATS Headquarters Overhead | 8,552,966 | 10,696,223 | 19,249,189 | 605,365 | 19,854,554 |
| FAA Regional Overhead | 782,769 | 815,928 | 1,598,696 | 44,321 | 1,643,017 |
| FAA Headquarters Overhead | 1,331,265 | 1,662,966 | 2,994,230 | 94,218 | 3,088,448 |
| Subtotal | 16,645,302 | 20,427,627 | 37,072,928 | 1,096,322 | 38,169,250 |
| **Capital Investment** | | | | | |
| AF Expensed F&E Labor/Non-Labor | 856,285 | 29,284 | 885,569 | 50,395 | 935,965 |
| ARA Expensed F&E Labor/Non-Labor | 4,195,267 | 7,162,951 | 11,358,217 | 423,829 | 11,782,046 |
| ATS RE&D Expensed Labor/Non-Labor | - | - | - | - | - |
| Depreciation | - | - | - | - | - |
| Subtotal | 5,051,552 | 7,162,951 | 11,358,217 | 474,224 | 13,141,840 |
| **OTHER COSTS** | | | | | |
| Gain/Loss | 924 | 505 | 1,429 | 49 | 1,478 |
| Accrued Liabilities | - | - | - | - | - |
| Subtotal | 924 | 505 | 1,429 | 49 | 1,478 |
| **Total Cost** | $ 76,748,628 | $ 105,522,978 | $ 181,415,320 | $ 28,433,940 | $ 211,158,659 |

[1] A complete description of each cost element may be found on pages 23-29 of the Arthur Andersen Costing Methodology Report.

# Attachment 2

# FAA Cost Accounting System:
# Service Definitions

This document has been prepared by the FAA to address issues raised in the comments received to date by the FAA's on its "Fees for FAA Services for Certain Flights" Interim Final Rule. It provides further clarification of key service definitions used by the agency for costing purposes.

**Cost Accounting System: Service Definitions**

The FAA's Cost Accounting System identifies costs associated with providing four specific Air Traffic Control (ATC) Services. Only costs assigned to the Oceanic and Enroute Services have been included in the calculation of overflight fees[1]. While many overflights routinely make use of both Terminal and Flight Services, the costs of these two Services have not been charged to overflight users.

FAA's four ATC Services have been defined for costing purposes as follows:

***Oceanic Services***: ATC Services provided in airspace where oceanic separation and procedures prescribed by the International Civil Aviation Organization (ICAO) are applied. These services (with a few exceptions) are defined by specific designated Flight Information Region (FIR) boundaries and generally begin just prior to the limits of the radar coverage. Generally, within Oceanic FIR airspace, no radar service is available. Therefore, oceanic air traffic separation standards (position reports at selected time/geographic intervals) are used, rather than enroute separation standards (position reports based on radar/transponder activity).

Within the Cost Accounting System, Oceanic airspace is designated if oceanic separation standards are used primarily throughout the majority of the airspace. The New York, Oakland, Anchorage, and Houston Oceanic airspace met these criteria in Fiscal Year 1999. The Miami offshore airspace, on the other hand, did not meet the criteria for Oceanic designation because enroute separation standards are maintained there using available radar surveillance. For example, the Bahamas FIR, a part of Miami Oceanic airspace, provides radar coverage and uses enroute separation standards, thereby causing it to be designated as Enroute. [2]

***Enroute Services:*** Generally refers to ATC Services provided to aircraft operating primarily under instrument flight rules in controlled airspace between airport terminal areas. In some cases, Enroute service may be provided to aircraft operating under visual flight rules. Enroute

---

[1] Overflights are flights that cross US-controlled airspace but neither take-off nor land in the United States.

[2] Precise boundary definitions, including those between the Oceanic and Enroute Services, are included in the Document entitled "Description of U.S.-Controlled Airspace", May 26, 2000. This document was previously placed in the docket (item #5 in docket no. FAA-00-7018).

services are also provided to flights that overfly US-controlled airspace. Twenty-one service delivery points, referred to as Air Route Traffic Control Centers (ARTCCs), provide this service. The typical ARTCC has responsibility for more than 120,000 square miles of airspace.

Within the FAA's Cost Accounting System, airspace is considered "Enroute" if it is has not been designated as specific Terminal or Oceanic airspace. Aircraft operating in transition to/from Oceanic airspace are considered to be operating within the Enroute environment since during this phase of the flight there is generally radar service provided to the aircraft.

***Terminal Services:*** Generally refers to ATC Services provided to aircraft controlled by approach control facilities or airport traffic control tower facilities. This service is provided by more than 400 service delivery points, including Terminal Radar Approach Control Facilities (TRACONs) and Airport Traffic Control Towers (ATCTs).

While airspace configurations differ from one terminal service delivery point to another, terminal air traffic services are normally used by flights at 16,000 feet of altitude and below. Such flights are generally ascending from or descending to an airport.

***Flight Services:*** Generally refers to advisory and assistance services provided to users of the National Airspace System (NAS). These services include pilot briefings, search and rescue services, assisting lost aircraft and aircraft in emergency situations, relaying ATC clearances originating Notices to Airmen, broadcasting aviation weather and NAS information, receiving and processing flight plans, and monitoring navigational aids. In addition, at selected locations, Flight Services include providing Enroute Flight Advisory Services (Flight Watch), taking weather observations, issuing airport advisories, and advising the Customs and Immigration Services of trans-border flights. There are sixty-one Flight Service Stations providing these services.